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CASE REPORT

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Cervical cyst of the ligamentum flavum and C7-T1 subluxation: case report

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Abstract A patient with progressive gait disturbance resulting from a cyst of the cervical ligamentum flavum associated with C7-T1 listhesis is reported. Surgical removal of the cyst improved the patient's myelopathy. Intraspinal degenerative cysts are preferentially located in the lumbar region:unusual is the cervical localization. Differential diagnosis includes ligamentum flavum cyst, synovial and ganglion cysts. Association between degenerative intraspinal cysts and listhesis is discussed. To our knowledge, this is the first case of cyst of the ligamentum flavum associated with cervical subluxation.

Keywords Cyst · Ligamentum flavum · Cervical spine · Subluxation

Introduction

Cysts of the ligamentum flavum are rare lesions that are most frequently located in the lumbar spine [1 – 4, 21, 23], the cervical localization is unusual [11]. Most of the intraspinal degenerative cysts are juxta-articular (synovial and ganglion) cysts, and have a similar radiologic appearance [8, 12, 15, 16, 20]. We report the unique neuroimaging and pathological findings obtained in a patient with a cyst of the ligamentum flavum in the cervical region associated with a C7-T1 subluxation. This report, to our information, is the first of its kind.

Case report

This 66-year-old woman presented with a 1-year history of progressive gait disturbance with lower extremity fatigue. Clinical examination revealed marked spastic paraparesis and difficulty in performing fine motor tasks with the left hand as well as loss of penmanship of the right hand. MRI revealed a T2-hyperintense cystic lesion with a hypointense tail in the anterolateral part of the left lamina of C7 (Fig. 1**a**), associated with a C7-T1 anterolisthesis (Fig. 1**b**). The patient underwent a C7-T1 hemilaminectomy and a hypertrophied, partially calcified ligamentum was resected. A round, yellowish cyst of about 1 cm in diameter filled with gelatinous fluid was found in the internal aspect of the ligamentum flavum; it was adherent to the duramater but dissection was achieved easily. There was no communication between the lumen of the cyst and the joint capsule. Pathological examination of the cyst revealed myxoid and pseudocystic degeneration of the ligamentum flavum without a synovial layer (Fig. 2). A postoperative dynamic X-ray revealed no spinal instability with resolution of the cervicothoracic subluxation. The patient's myelopathy

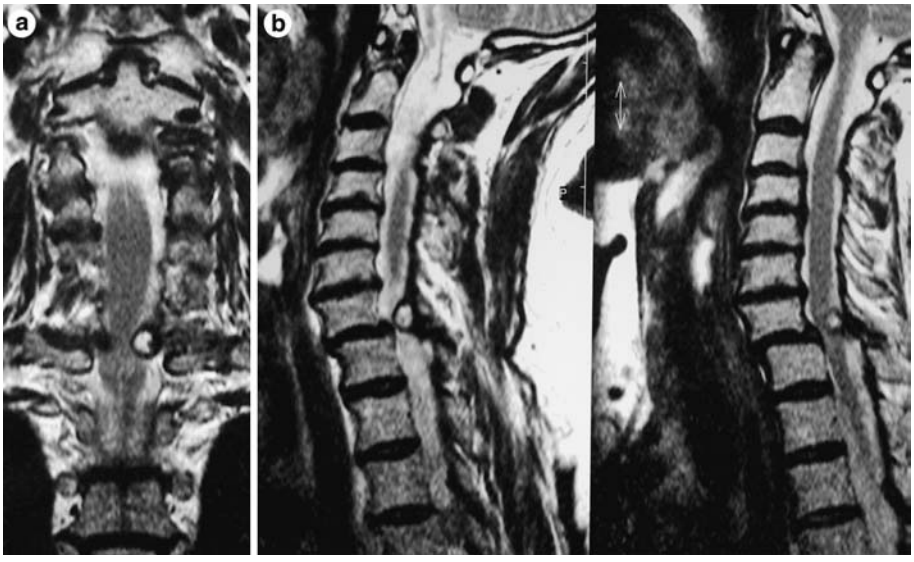

Fig. 1 Coronal **(a)** and Sagittal **(b)** T2-weighted MR preoperative images revealing an intraspinal cystic lesion in the anterior aspect of the C7 lamina, associated with a C7-T1 subluxation

improved partially after the second month of physiotherapy. A clinical follow-up after 1 year confirmed a marked improvement of the neurological deficits.

Discussion

Intraspinal degenerative cysts are rare, they occur preferentially in the lower lumbar region. In previously reported cases, cysts of the ligamentum flavum were at L4-L5 and L5-S1 level [1, 3, 4, 10, 18, 23]; cervical localization has seldom been described [11]. Neuroimaging is helpful in diagnosing cervical cyst of the ligamentum flavum. On myelography, these lesions are recognized as intraspinal extradural masses and on postmyelogram CT as a faint cyst adjacent to the ligamentum flavum [23]. MRI provides the best images: on T1-weighted images, the cysts have a variable signal and on T2-weighted images, the cysts have a high intensity signal [7, 13, 17, 21]. Differential diagnosis of imaging studies between ligamentum flavum cysts and synovial cysts is useful to the surgeon, as the latter are more difficult to resect, requiring exploration of the facet joint. MRI, in some cases of synovial cysts, reveals a demonstrable communication with the facet joint with enhancement of the synovial cyst wall and of the adjacent facet joint [24]; juxta-articular cysts often have a calcified rim while ligamentum flavum cysts don't. Differential diagnosis of intraspinal extradural mass lesions includes ligamentum flavum cyst, juxta-articular cysts (ganglion and synovial cysts), arachnoid cyst, perineural cyst and dermoid cyst [8, 9, 12, 15, 17, 19]. The nomenclature of cysts in the spinal canal is somewhat unclear in the literature. Most of the intraspinal cyst reported are juxtraarticular cysts. Ligamentum flavum and juxta-articular cysts can be distinguished only by their pathological findings [20]. Indeed, we could diagnose the type of the resected cyst only after pathological diagnosis.

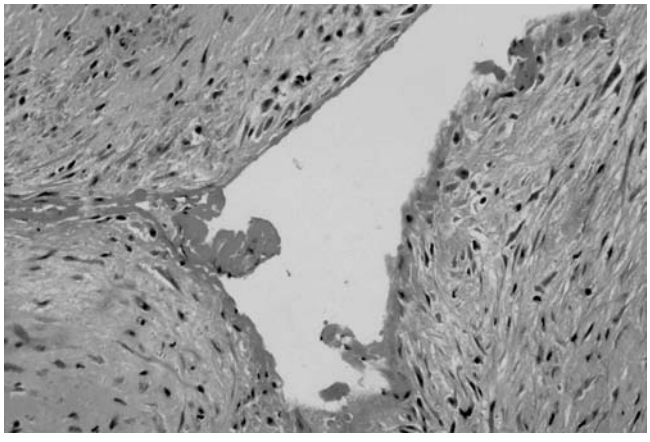

Fig. 2 Photomicrographs of operative specimen, showing a pseudocystic and myxoid degeneration of the ligamentum flavum and a cystic cavity without an evident synovial layer (hematoxylin and eosin stain, original magnification × 350)

Synovial and ganglion cysts are in relation with the facet joints [5, 14]: synovial cysts are in communication with the joint cavity and have a synovial lining with pseudostratified columnar cells and contain a clear and serous fluid while the spinal ganglion cysts are adjacent to the facet joint and the synovial lining is absent. They have a fibrous connective tissue wall and contain a gelatinous, highly viscous fluid. Cysts of the ligamentum flavum have a myxoid degeneration and arise from or are partially embedded in the inner surface of this ligament, and in contrary to juxta-articular cysts,

are not related to the facet joint cavity. Pathogenesis of the cyst formation is secondary to ligamentous and fibrocollagenous tissue degeneration and hypermobility of the spinal segment, mainly at the transitional zones between the mobile and the fixed segments of the spine. In our case, minor chronic trauma due to the microinstability of listhesis may explain the formation of the cyst. In most of the cases, intraspinal degenerative cysts in the lumbar spine occur at L4-L5, the most mobile segment within the lumbar spine and are frequently associated with lumbar degenerative spondylolisthesis [20]. Cervical degenerative cysts are preferentially located in the cervicothoracic junction. Krauss et al. [16] speculated that C7-T1 segment is the most mobile segment immediately superior to the immobile thoracic spine. Continuous stress to the ligamentum flavum due to minor chronic trauma such as listhesis may predispose to the formation of the cyst [6]. Only in a few cases is the localization of cysts C6-C7, C3-C4 and C5-C6 levels [22]. However, in our case, the subluxation resolved after resection of the cyst, which may imply that the cyst, in contrary to what is reported, could be the primary event that caused the subluxation later.

Note To the best of our knowledge, our case represents the first report of a ligamentum flavum cyst in association with a cervicothoracic subluxation.

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